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PATENT APPLICATION

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Inventor(s): **Martin A. Schlosser**

Serial No.: **09/994,257** **Examiner: Jermie E. Cozart**

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Title: **METHOD OF MANUFACTURING A FLOWMETER FOR THE PRECISION MEASUREMENT OF AN ULTRA PURE MATERIAL FLOW**

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BRIEF ON APPEAL

INTRODUCTION

Pursuant to the provisions of 37 CFR § 1.191 *et seq.*, applicants hereby appeal to the Board of Patent Appeals and Interferences (the "Board") from the examiner's final rejection dated 9/9/2005. A notice of appeal was sent on the same day as this appeal brief. This brief on appeal is accompanied by the requisite fee (37 CFR 41.20(b)(2)).

REAL PARTY IN INTEREST

The entire interest in the present application has been assigned to Emerson Electric Co. as recorded at Reel 012334, Frame 0370.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1, 3 – 10, 12 – 19, 23 – 27, 30 – 33, and 50 – 51 are pending.

Claims 34 – 49 are withdrawn from consideration pursuant to a restriction requirement.

Claims 2, 11, 20 – 22, 28 and 29 have been canceled.

Claims 3 – 10, 12 – 15, 17 – 19, 23 – 27, 30 and 31 are objected to as being dependent on a rejected base claim, but would be allowable if re-written in independent form.

Claims 1, 16, 32, 33, 50 and 51 have been finally rejected.

Claims 1, 16, 32, 33, 50 and 51 are on appeal.

STATUS OF AMENDMENTS

Claim 1 has an amendment pending that corrects an informality by spelling out what PFA (perfluoroalkoxy copolymer) and PTFE (polytetrafluorethylene) stand for.

SUMMARY OF CLAIMED SUBJECT MATTER

The current application discloses a method of manufacturing a Coriolis flowmeter adapted to extend a received process material flow having an ultra high level of purity free from contamination due to ion transfer from said Coriolis flow meter to said process material; said method comprising the following steps. Coupling a flow tube means (page 3 lines 5 – 13, 102) to a base (116), wherein said flow tube means is formed entirely from PTFE or PFA (page 12 line 30 – page 13 line 5). Affixing a driver (143) to said flow tube means (page 4 line 34 – page 5 line 10). Coupling a pick-off means (142, 144) to said flow tube means (page 4 line 34 – page 5 line 10). And affixing inlet and outlet ends of said flow tube means to at least one process connection (Page 14 line 25 – page 15 line 11, 108, 107).

Grounds of rejection to be reviewed on appeal

1. Whether claims 1, 16, 32, 33, 50 and 51 are unpatentable under 35 U.S.C. § 103(a) over Sipin (US 4,559,833) in view of Van der Pol (US 5,918,285).

ARGUMENT

OUTLINE

I. Summary of the brief on appeal.

II. Summary of the requirements for *prima facie* obviousness.

III. Claims 1, 16, 32, 33, 50 and 51 rejection.

I. Summary of the brief on appeal

A. The 35 U.S.C. § 103(a) rejection of claims 1, 16, 32, 33, 50 and 51 is improper because a *prima facie* case for obviousness has not been established, for the following reasons: (1) the cited art does not teach or suggest every element of the claim, (2) the examiner incorrectly characterizes the cited art, (3) the examiner's conclusion of obviousness is based on improper hindsight reasoning, (4) there was no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

II. Summary of the requirements for *prima facie* obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable

expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

MPEP 2143.03

The prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim dependent therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

MPEP 2142.

"To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings."

"To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." MPEP 2142. "The teaching or suggestion to make the claimed combination... must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2ed 488, 20 USPQ2ed 1438 (Fed. Cir. 1991). "The level of skill in the art cannot be relied upon to provide the suggestion to combine references." *Al-Site corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999). "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination" In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

III. Claims 1, 16, 32, 33, 50 and 51 rejection.

Claims 1, 16, 32, 33, 50 and 51 have been finally rejected as being unpatentable under 35 U.S.C. § 103(a) over Sipin (US 4,559,833) in view of Van der Pol (US 5,918,285). Claim 1

requires:

1. A method of manufacturing a Coriolis flowmeter adapted to extend a received process material flow having an ultra high level of purity free from contamination due to ion transfer from said Coriolis flow meter to said process material; said method comprising the steps of:

coupling a flow tube means to a base, wherein said flow tube means is formed entirely from PTFE or PFA;

affixing a driver to said flow tube means;

coupling a pick-off means to said flow tube means; and

affixing inlet and outlet ends of said flow tube means to at least one process connection.

Sipin discloses a method to manufacture a Coriolis flow meter. The examiner states that "Sipin does not explicitly disclose that the flow tube means is made entirely of PTFE or PFA material", see page 3 of the final office action. The examiner then cites Van der Pol as a flow meter that discloses a flow tube made entirely of PTFE and states that it would have been obvious to combine Van der Pol with Sipin.

To form a legally sustainable 35 U.S.C. §103(a) obviousness rejection the Examiner must set forth a believable characterization of how the disclosures of the two references could be combined to form an operable structure that makes obvious the applicants' claimed invention. In so doing the Examiner must not employ hindsight.

The vibrating element of a Coriolis flow meter is a critical element of the Coriolis flow meter and a change in the material from metal to PFA or PTFE would result in a drastic change in the functionality of the modified Coriolis flow meter. The characteristics of PFA or PTFE are completely different than the comparable characteristics of glass or metal. PFA or PTFE tubes are slippery, flaccid, and difficult to work with. Glass and metal Coriolis flow tubes are rigid, easily coupled to other structural elements, and have distinct and well defined vibration modes. The material used for the vibrating element in one type of Coriolis flow meter may not work for a Coriolis flow meter with a different type of vibrating element. It is believed that the examiner has used impermissible hindsight to substitute a PTFE material from a Coriolis flow meter with one type of vibrating element into the design of a Coriolis flow meter with a completely different type of vibrating element.

The flow tube in Van der Pol does not teach or enable the flow tube of claim 1. The flow tube in Van der Pol is a thick walled tube (column 4 lines 10 – 12). The thick walled tube has recesses cut into the thick walls. A thin wall segment is left in the bottom of the recess areas of the thick walled tube. It is these thin wall sections that vibrate and respond to the Coriolis effect in Van der Pol (column 4 lines 17 – 28). Most of the tube in Van der Pol (the thick walled part) does not vibrate. Claim 1 requires a flow tube means. The structure disclosed in the specification is a flow tube (102) that vibrates along its length, not in small thin walled segments. Because only the thin walled segments of Van der Pol vibrate, Van der Pol can not teach a flow tube that vibrates along its length made entirely from PFA or PTFE. Therefore the combination of Van der Pol and Sipin do not form an operable structure that makes obvious the invention of claim 1.

The Examiner's rejection of claim 1 is also devoid of evidence proving motivation to combine. The format of the Examiner's 35 U.S.C. §103(a) rejection is to characterize the disclosure of the cited references and then to conclude with an unsupported assertion that it would be obvious to combine the two references to anticipate the rejected claim.

Page 700-31 of column 1 of MPEP §706.02(j) states that:

> ...the burden is on the Examiner to provide the suggestion of desirability of doing what the Examiner has done. It further states that the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in the light of the teaching of the references.

The Examiner's rejection does not meet these requirements. The examiner has not cited where the references "expressly or impliedly suggest the claimed invention". And the examiner has not presented a convincing line of reasoning how someone skilled in the arts would have been motivated to combine the vibrating thin walled segments of Van der Pol with the vibrating flow tube of a Sipin.

For the reasons cited above it is believed that claim 1 is allowable as written.

Claims 16, 32, 33, 50 and 51 are dependent on allowable claim 1 and are therefore allowable.

Conclusion

In view of the above, applicant respectfully request that the examiner's rejection of claims 1, 16, 32, 33, 50 and 51 be reversed.

The Director is hereby authorized to charge the fee for filing a brief in support of an appeal and to charge any fees which may be required, or credit any overpayment to Deposit Account No. 502622.

Respectfully submitted,

Date: 11/7/05

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APPENDIX I
CLAIMS CURRENTLY PENDING

1. A method of manufacturing a Coriolis flowmeter adapted to extend a received process material flow having an ultra high level of purity free from contamination due to ion transfer from said Coriolis flow meter to said process material; said method comprising the steps of:

coupling a flow tube means to a base, wherein said flow tube means is formed entirely from PTFE or PFA;

affixing a driver to said flow tube means;

coupling a pick-off means to said flow tube means; and

affixing inlet and outlet ends of said flow tube means to at least one process connection.

2. (Canceled)

3. The method of claim 1 characterized in that said step of coupling said flow tube means to said base is proceeded by the step of etching said flow tube means to create a surface suitable for coupling and affixing flowmeter components.

4. The method of claim 3 characterized in that said etching step comprises the step of using an etching solution containing a glycol diether.

5. The method of claim 3 characterized in that said etching step comprises the step of heating an etching solution to an elevated temperature.

6. The method of claim 3 characterized in that said etching step comprises the step of agitating said flow tube means in an etching solution.

7. The method of claim 1 characterized in that said step of coupling said flow tube means to said base is proceeded by the step of straightening said flow tube means to eliminate any inherent curvature or unwanted residual bends.

8. The method of claim 7 characterized in that said straightening step comprises the steps of:

placing said flow tube means in a straightening fixture;

heating said flow tube means and said straightening fixture;

cooling said flow tube means and said straightening fixture; and

removing said flow tube means from said straightening fixture.

9. The method of claim 1 characterized in that said step of coupling said flow tube means to said base comprises the step of attaching said flow tube means to said base using adhesive.

10. The method of claim 9 characterized in that said step of coupling said flow tube means to said base using said adhesive comprises the step of using cyanoacrylate adhesive.

11. (Canceled)

12. The method of claim 1 characterized in that said step of affixing said driver means to said flow tube means further comprises the step of

attaching said driver means to said flow tube means using adhesive.

13. The method of claim 12 characterized in that said step of affixing said driver means to said flow tube means further comprises the step of using cyanoacrylate adhesive.

14. The method of claim 1 characterized in that said step of coupling said pick-off means to said flow tube means further comprises the step of attaching said pick-off means to said flow tube means using adhesive.

15. The method of claim 14 characterized in that said step of coupling said pick-off means to said flow tube means further comprises the step of using cyanoacrylate adhesive.

16. The method of claim 1 further comprising coupling said at least one process connection to said base.

17. The method of claim 16 characterized in that the step of coupling said process connection to said base comprises the steps of:

forming a receiving hole into said base; and

securing a fixed element of said process connection into said receiving hole.

18. The method of claim 17 characterized in that the step of securing said fixed element of said process connection into said receiving hole comprises the step of adhering said fixed element of said process connection into said receiving hole.

19. The method of claim 18 characterized in that said step of adhering said fixed element of said process connection into said receiving hole further comprises the step of using cyanoacrylate adhesive.

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. The method of claim 16 characterized in that said step of coupling said process connection to said base comprises the step of adhering a fixed element of said process connection onto said base.

24. The method of claim 23 characterized in that said step of adhering said process connection to said base further comprises the step of using cyanoacrylate adhesive.

25. The method of claim 1 characterized in that said step of affixing said ends of said flow tube means to said at least one process connection comprises the steps of:

flaring said end of said flow tube means; and

inserting said flared end of said flow tube means onto conical stub of said at least one process connection.

26. The method of claim 1 characterized in that said step of affixing said end of said flow tube means to said at least one process connection comprises the steps of:

inserting said end of said flow tube means through said at least one process connection until said end of said flow tube means are flush with face of said at least one process connection; and

sealing said end of said flow tube means to said face of said at least one process connection.

27. The method of claim 26 characterized in that said step of sealing said end of said flow tube means to said face of said at least one process connection comprises the step of adhering said end of said flow tube means to said face of said at least one process connection.

28. (Canceled)

29. (Canceled)

30. The method of claim 26 characterized in that said step of sealing said end of flow tube means to said face of said at least one process connection comprises the step of laser welding said end of said flow tube means to said face of said at least one process connection.

31. The method of claim 1 characterized in that said step of coupling said pick-off means to said flow tube means comprises the step of making portions of said flow tube means opaque in order to facilitate use of optical pick-offs.

32. The method of claim 1 further comprising affixing a temperature sensing device to said Coriolis flowmeter.

33. The method of claim 32 characterized in that said step of affixing a temperature sensing device comprises the step of affixing a resistance temperature measuring device to said Coriolis flowmeter.

34. (Withdrawn) The method of claim 32 characterized in that said step of affixing a temperature sensing device comprises the step of affixing an infrared temperature measuring device to said Coriolis flowmeter.

35. (Withdrawn) A Coriolis flowmeter for measuring a process material flow having an ultra high level of purity free from contamination due to ion transfer from said flow meter to said process material; said Coriolis flowmeter comprising:

a base;

flow tube means coupled to said base;

a driver affixed to said flow tube means for vibrating said flow tube means at the resonant frequency of said flow tube means with process material flow;

pick-off means coupled to said flow tube means for generating signals representing induced Coriolis deflections of the portions of said vibrating material filled flow tube means proximate said pick-off means; and

at least one process connection means coupled to said flow tube means to form an ultra pure flow path for a process material to flow through.

36. (Withdrawn) The Coriolis flowmeter of claim 33 characterized in that said flow tube means is formed of PFA to maintain said process material flow free from contamination due to ion transfer from said flow tube means to said process material.

37. (Withdrawn) The Coriolis flowmeter of claim 35 characterized in that said Coriolis flow meter comprises an O-ring for coupling said flow tube means to said base.

38. (Withdrawn) The Coriolis flow meter of claim 35 characterized in that said process connection means is coupled to said base.

39. (Withdrawn) The Coriolis flowmeter of claim 38 characterized in that said base comprises at least one receiving hole for securing a fixed element of said process connection means.

40. (Withdrawn) The Coriolis flowmeter of claim 39 characterized in that said receiving hole is threaded.

41. (Withdrawn) The Coriolis flowmeter of claim 35 characterized in that said base comprises at least one locking hole for securing said process connection means into said receiving hole.

42. (Withdrawn) The Coriolis flowmeter of claim 41 characterized in that said locking hole is threaded.

43. (Withdrawn) The Coriolis flowmeter of claim 41 characterized in that said locking hole comprises a locking mechanism.

44. (Withdrawn) The Coriolis flowmeter of claim 43 characterized in that said locking mechanism is a set screw.

45. (Withdrawn) The Coriolis flowmeter of claim 35 characterized in that said process connection means is of the flare connection type.

46. (Withdrawn) The Coriolis flowmeter of claim 35 characterized in that said flow tube means comprises portions that are opaque preventing light from passing through said flow tube means.

47. (Withdrawn) The Coriolis flowmeter of claim 35 characterized in that said Coriolis flowmeter further comprises a temperature sensing device.

48. (Withdrawn) The Coriolis flowmeter of claim 47 characterized in that said temperature sensing device is of the resistive type.

49. (Withdrawn) The Coriolis flowmeter of claim 47 characterized in that said temperature sensing device is of the infrared type.

50. The method of claim 1 characterized in that said step of affixing inlet and outlet ends of said flow tube means to the at least one process connection further comprises the step of forming the at least one process connection from PTFE or PFA to form an ultra pure flow path for a process material flow through said flowmeter.

51. The method of claim 1 characterized in that said step of affixing inlet and outlet ends of said flow tube means to the at least one process connection further comprises the step of forming the at least one process connection entirely from PTFE or PFA to form an ultra pure flow path for a process material flow through said flow meter.

APPENDIX II
EVIDENCE SUBMITTED

None submitted.

APPENDIX III
RELATED PROCEEDINGS

No related proceedings.